BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

APPENDIX A

Proposed New Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants

REGULATION 13
CLIMATE POLLUTANTS
RULE 5
INDUSTRIAL HYDROGEN PLANTS

INDEX

13-5-600 MANUAL OF PROCEDURES

REGULATION 13
CLIMATE POLLUTANTS
RULE 5
INDUSTRIAL HYDROGEN PLANTS

(Adopted _____, 2022___)

13-5-100 GENERAL

13-5-101 Description: The purpose of this Rule is to limit total organic compounds (TOC) emissions—including methane—from industrial hydrogen plants.

13-5-102 Applicability: Upon adoption, this Rule applies to industrial hydrogen plants including third parties.

13-5-103 Exemption, Specific Operations: Specific operations of methane and/or organic compound emissions already subject to methane and/or organic compound emission requirements in Regulation 8: Organic Compounds, Rule 5: Storage of Organic Liquids; Regulation 8: Organic Compounds, Rule 10: Process Vessel Depressurization, Regulation 8: Organic Compounds, Rule 18: Equipment Leaks; and Regulation 8: Organic Compounds, Rule 28: Episodic Releases From Pressure Relief Devices at Petroleum Refineries and Chemical Plants shall be exempt from this Rule.

13-5-104 Limited Exemption, Deaerator Vents and Carbon Dioxide Scrubbing Vents: Deaerator vents and carbon dioxide scrubbing vents shall be exempt from the requirements in Section 13-5-300 of this Rule.

13-5-105 Limited Exemption, Small Scale Industrial Hydrogen Plants: The requirements of Sections 13-5-300, 400, 600 shall not apply to industrial hydrogen plants that that have a maximum design production capacity that is less than 20 tons of hydrogen per day, provided that the owner and/or operator meets the recordkeeping requirements of Section 13-5-506.3.

13-5-200 DEFINITIONS

13-5-201 Alternative Compliance Plan: A document meeting the requirements of Section 13-5-404 that identifies, among other things, sources, quantities, emissions, and emissions reduction measures that would be implemented to comply with the standards and deadlines set forth in Section 13-5-303.

13-5-202 Atmospheric Vent: An opening where a gas or gases are continuously or periodically discharged during hydrogen plant operations. Atmospheric vents include openings where a gas or gases are discharged directly to the atmosphere. For the purposes of this Rule, an atmospheric vent may be physically located in any portion of an industrial hydrogen plant.

13-5-203 Carbon Dioxide Scrubbing Vent: The atmospheric vent from a device or process unit that adsorbs carbon dioxide from a mixture of gases.

13-5-204 Deaerator Vent: The atmospheric vent from a device that removes oxygen and other dissolved gases from liquids.

13-5-205 Effective Date: This Rule is effective upon adoption. However, the date when the requirements of Section 13-5-301 take effect shall be as set forth in Section 13-5-401. The date when the requirements of Section 13-5-303 take effect shall be as set forth in Section 13-5-405.

13-5-206 Global Warming Potential: A comparison of the integrated radiative forcing over a specified period (i.e., 100 years) from a unit mass pulse emission to compare the potential climate change associated with emissions of different greenhouse gases. GWPs listed include climate-carbon feedbacks. This Rule incorporates GWPs as listed in Regulation 3, Schedule T, Greenhouse Gas Fees, Global Warming Potential Relative to Carbon Dioxide.

13-5-207 Greenhouse Gas: "Greenhouse gas" (GHG) or "greenhouse gases" (GHGs) includes all of the following gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

13-5-208 Industrial Hydrogen Plant: For the purposes of this Rule, an industrial hydrogen plant is a comprehensive hydrogen operation including, but not limited to, all operations that produce hydrogen via steam-methane reformation, and the hydrogen distribution system, including all compression operations, and the hydrogen delivery system that delivers hydrogen streams to the process unit consumers.

13-5-209 Organic Compound: As defined in Regulation 1: General Provisions and Definitions, Section 1-233.

13-5-210 Owner and/or Operator: A representative of the facility or corporation who possesses sufficient authority to take actions required for compliance with this Rule.

13-5-211 Steam-Methane Reformation Process: an industrial chemical process in which steam is used to produce hydrogen from a hydrocarbon source, such as natural gas in accordance with the following chemical reaction:

Steam-methane reforming reaction

$$CH_4 + H_2O \rightarrow CO + 3H_2$$

In a subsequently process called the "water-gas shift reaction," the carbon monoxide and steam are reacted using a catalyst to produce carbon dioxide and more hydrogen in accordance with the following chemical reaction:

Water-gas shift reaction:

$$CO + H_2O \rightarrow CO_2 + H_2$$

13-5-212 Total Organic Compound (TOC): Any organic compound or mixture of organic compounds, including methane.

13-5-300 STANDARDS

13-5-301 Emission Limits for Industrial Hydrogen Plants: By the Effective Date, the owner and/or operator of an industrial hydrogen plant shall not vent to the atmosphere out of any atmospheric vent any emissions containing more than 15 pounds (6.8 kilograms) per day and 300 parts per million by volume (TOC, expressed as methane, on a dry basis determined as specified in Section 13-5-601). A source shall be considered in violation of this section if the TOC emissions measured in accordance with Sections 13-5-501 and 13-5-601 exceed the standards of this Rule.

13-5-302 Prohibition of Comingling and Dilution: The dilution of any atmospheric vent that is in service prior to the adoption of this Rule, or the comingling of two or more atmospheric vents, or both, to reduce the TOC concentration to comply with the emission standard set forth in Section 13-5-301 are prohibited.

13-5-303 Alternative Methane and Other Greenhouse Gas Emissions Standard Option: In lieu of compliance with Section 13-5-301, the owner and/or operator of an industrial hydrogen plant may opt to comply with this Rule by reducing the baseline methane emissions from the industrial hydrogen plant by at least 90 percent on a calendar year basis from atmospheric vents. Up to 20 percent of the methane reductions required may take the form of other GHG reductions from vents at the industrial hydrogen plant. These substituted emission reductions of other GHGs shall be adjusted based on global warming potential. To comply with this option, all of following conditions shall be met:

303.1 No later than six months after the adoption date of this Rule, the owner and/or operator shall notify the APCO in writing that the owner and/or operator of an industrial hydrogen plant have opted to comply with the Rule by means of this section;

303.2 No later than one year following the adoption date of this Rule, the owner and/or operator shall make an estimate of the baseline methane and other GHG emissions to be considered under this option for the industrial hydrogen plant in accordance with Section 13-5-403 and submit the estimate to the APCO for validation;

303.3 No later than six months following the validation by the APCO of the baseline methane and other GHG emissions calculated pursuant to Section 13-5-403, the owner and/or operator shall submit to the APCO for review and approval an Alternative Compliance Plan that demonstrates how methane and other GHG emission reductions would be achieved based on the validated baseline methane emissions as determined according to Section 13-5-403. The Alternative Compliance Plan shall be submitted in accordance with Section 13-5-404 and shall contain all information deemed necessary for the APCO to determine the efficacy of the plan. The APCO may request additional information to complete the review and approval of the Alternative Compliance Plan;

303.4 No later than two years following the adoption date of this Rule, the APCO shall approve or deny the Alternative Compliance Plan to meet this alternative standard. In the event that the plan is denied, the owner and/or operator of an industrial hydrogen plant may not utilize this optional standard and must comply with Sections 13-5-301 and 13-5-401.

13-5-400 ADMINISTRATIVE REQUIREMENTS

13-5-401 Control Device Requirements for Industrial Hydrogen Plants: The owner and/or operator of an industrial hydrogen plant shall comply with the following requirements provided the hydrogen plant does not already comply with the requirements of Section 13-5-301:

401.1 Within three years of adoption of this Rule, the owner and/or operator, including the owner and/or operator that submits an Alternative Compliance Plan pursuant to Section 13-5-303 that is not approved, must submit a permit application to the APCO for an Authority to Construct and/or Permit to Operate of a TOC control device to comply with Section 13-5-301 requirements.

401.2 Upon receiving an Authority to Construct from the Air District, the owner and/or operator of an industrial hydrogen plant shall commence construction of the control device during the next scheduled turnaround; however, such construction shall begin no later than two years following the issuance of the Authority to Construct.

401.3 Within one year of commencing construction of the control device, the owner and/or operator of an industrial hydrogen plant shall commence operation of the control device to comply with Section 13-5-301 requirements.

This section does not apply to the owner and/or operator who has submitted an Alternative Compliance Plan pursuant to Section 13-5-303 that is approved by the APCO.

13-5-402 Reporting Requirements for Total Organic Compounds Vented from Industrial Hydrogen Plants: Should an existing industrial hydrogen plant with a fully operational TOC control device vent TOC from atmospheric vents in excess of the standards required by Section 13-5-301, the owner and/or operator shall do the following:

402.1 Notify the APCO of the venting occurrence within seventy-two hours of the beginning of the occurrence if the TOC emissions exceed limits in Section 13-5-301.

402.2 If notification to the APCO is required pursuant to Section 13-5-402.1, the owner and/or operator shall report the following information to the APCO: the cause of the occurrence; the date and time of the occurrence; data for the duration of the occurrence; the make, model and type of control device; the operating parameters of the control device including temperature, pressure, flow rate, and concentrations of each constituent in the gaseous stream; and the mass emissions for each constituent in the gaseous stream including TOC. The report is due within ten business days of the conclusion of the TOC gas venting occurrence.

13-5-403 Baseline Methane and Other Greenhouse Gas Emissions Calculation Procedures: The following methodology shall be used to determine baseline methane and GHG emissions for an industrial hydrogen plant for the purposes of determining compliance with Section 13-5-303:

403.1 Determine Baseline Period: The baseline period is the three-year period from January 1, 2016, through December 31, 2018.

403.2 Determine Baseline Methane and Other Greenhouse Gas Emissions: Baseline methane and other GHG emissions are the actual average annual emissions during the baseline period. The applicant must have sufficient verifiable records of the industrial hydrogen plant's operation to substantiate the emission rate during the entire baseline period.

13-5-404 Plan Submission for the Alternative Methane and Other Greenhouse Gas Emissions Standard Option: No later than six months following the validation by the APCO of the baseline methane and other GHG emissions calculated pursuant to Section 13-5-403, the owner and/or operator of an industrial hydrogen plant who has opted to comply with this Rule pursuant to Section 13-5-303 shall provide an Alternative Compliance Plan with the following information to the APCO:

404.1 Piping and instrumentation diagrams identifying all atmospheric vents, carbon dioxide scrubbing vents, and deaerator vents at the industrial hydrogen plant.

404.2 Estimates of the annual methane emissions for each atmospheric vent.

404.3 Methane concentration data and flowrate, temperature, flowrate, and volume data that were used to estimate the methane emissions for each atmospheric vent.

404.3 Identification of the vents that would be included in the Alternative Compliance Plan and the method and degree to which each atmospheric vent, deaerator vent and/or carbon dioxide scrubbing vent would be controlled.

404.4 Estimates of other GHG reductions (expressed as GHG equivalent reductions) for each atmospheric vent, deaerator vent, and/or carbon dioxide scrubbing vent.

404.5 Any information deemed necessary to verify the estimate of GHG-equivalent reductions in Section 13-5-404.4.

13-5-405 Implementation of the Alternative Methane and Other Greenhouse Gas Emissions Standard Option: The owner and/or operator of an industrial hydrogen plant with the Alternative Compliance Plan approved pursuant to Section 13-5-303 shall implement the as follows:

405.1 Within one year of approval of the Alternative Compliance Plan pursuant to Section 13-5-303, the owner and/or operator must submit a permit application to the APCO for an Authority to Construct and Permit to Operate to comply with the plan approved pursuant to Section 13-5-303.

405.2 Upon receiving an Authority to Construct from the Air District, the owner and/or operator of an industrial hydrogen plant shall commence construction and/or installation of equipment to comply with the Alternative Compliance Plan approved pursuant to Section 13-5-303 during the next scheduled turnaround; however, such construction shall begin no later than two years following the issuance of the Authority to Construct.

405.3 Within one year of commencing construction and/or installation of equipment to comply with the Alternative Compliance Plan approved pursuant to Section 13-5-303, the owner and/or operator of an industrial hydrogen plant shall commence operation of the equipment to comply with Section 13-5-303 requirements.

13-5-500 MONITORING AND RECORDS

13-5-501 Monitoring Requirements, General: Effective within a year from the adoption of this Rule, the owner and/or operator of any industrial hydrogen plant that will comply with Section 13-5-301 shall:

501.1 Monitor on a daily basis, TOC emissions in total pounds per day and measurement of TOC concentrations in parts per million by volume TOC, expressed as methane, on a dry basis for each atmospheric vent.

501.2 Continuously record temperature, pressure, flow rate and volume in million standard cubic feet per day for each atmospheric vent.

501.3 Convert TOC emissions data into mass emissions, in pounds per day, for both methane and organic compound emissions for each atmospheric vent.

501.4 By the next turnaround and no later than five years, the owner and/or operator of an industrial hydrogen plant shall install, operate, and maintain in good working order, a sampling point approved by the APCO for the purpose of testing emissions from each atmospheric vent. The owner and/or operator of an industrial hydrogen plant shall provide a piping and instrumentation diagram for each atmospheric vent and any information deemed necessary by the APCO to approve the sampling point.

13-5-502 Monitoring Requirements, Alternative Methane and Other Greenhouse Gas Emissions Standard Option: The owner and/or operator of an industrial hydrogen plant who has opted to comply with this Rule pursuant to Section 13-5-303 shall:

502.1 Monitor on a daily basis, methane emissions in total pounds per day and measurement of methane concentration in parts per million by volume, on a dry basis for each atmospheric vent.

502.2 Monitor on a daily basis, GHG emissions in total pounds per day and measurement of GHG compound concentrations in parts per million by volume, on a dry basis for each carbon dioxide scrubbing vent and/or deaerator vent.

502.3 Continuously record temperature, pressure, flow rate and volume in million standard cubic feet per day for each atmospheric vent, carbon dioxide scrubbing vent, and/or deaerator vent at the industrial hydrogen plant.

502.4 Convert methane and other GHG emissions data into mass emissions, in pounds per day, for both methane and other GHG emissions for each atmospheric vent, carbon dioxide scrubbing vent and/or deaerator vent.

502.5 By the next turnaround and no later than five years, the owner and/or operator of an industrial hydrogen plant shall install, operate, and maintain in good working order, a sampling point approved by the APCO for the purpose of testing emissions from each atmospheric vent, carbon dioxide scrubbing vent and/or deaerator vent. The owner and/or operator of an industrial hydrogen plant shall provide a piping and instrumentation diagram for each atmospheric vent, carbon dioxide scrubbing vent, and/or deaerator vent and any information deemed necessary by the APCO to approve the sampling point.

13-5-503 Reporting Requirements, Alternative Methane and Other Greenhouse Gas Emissions Standard Option: The owner and/or operator of any industrial hydrogen

plant who has opted to comply with this Rule pursuant to Section 13-5-303 shall submit a summary of the annual methane and other GHG emissions and emissions reductions calculated from the baseline emissions determined in accordance with Section 13-5-403 that indicates compliance with Section 13-5-303 at the end of the 30th day following the end of each year after the effective date of this Rule.

13-5-504 Monitoring Requirements, Deaerator Vents and Carbon Dioxide Scrubbing Vents: Effective within one year of the adoption of this Rule, the owner and/or operator of any industrial hydrogen plant that operates deaerators vent or carbon dioxide scrubbing vents shall:

504.1 Install, operate and maintain in good working order, a gas flowrate meter equipped with a readout and recorder for each deaerator vent and/or carbon dioxide scrubbing vent.

504.2 Monitor TOC emissions in parts per million by volume TOC, expressed as methane, on a dry basis from each deaerator vent and/or carbon dioxide vent on a quarterly basis. After eight quarterly samples have been obtained from each deaerator vent and/or carbon dioxide scrubbing vent, the owner and/or operator of an industrial hydrogen plant may submit a request to the APCO for a decreased monitoring frequency.

504.3 TOC emissions data from each deaerator vent and/or carbon dioxide scrubbing vent shall be recorded in mass emissions in pounds per day for both methane and organic compounds.

504.4 By the next turnaround and no later than five years, the owner and/or operator of an industrial hydrogen plant shall install, operate, and maintain in good working order, a sampling point approved by the APCO for the purpose of testing emissions from each deaerator vent and/or carbon dioxide vent. The owner and/or operator of an industrial hydrogen plant shall provide a piping and instrumentation diagram for each deaerator vent and/or carbon dioxide scrubbing vent and any information deemed necessary by the APCO to approve the sampling point.

13-5-505 Monitoring Requirements, Pressure Swing Adsorption Vents: Effective within a year from the adoption date of this Rule, the owner and/or operator of an industrial hydrogen plant shall demonstrate hydrogen gas percent purity via the use of a hydrogen gas analyzer or an alternative method approved by the APCO. Purity verification shall be recorded quarterly and will be available upon request by the APCO. All records shall be retained for a minimum of five years and shall be submitted to the APCO upon request.

13-5-506 Recordkeeping Requirements: The owner and/or operator of an industrial hydrogen plant shall keep the following records in a form suitable for inspection for a period of at least five years and made available to the APCO upon request.

506.1 For the owner and/or operator of an industrial hydrogen plant subject to the requirements of Section 13-5-301, these records shall include, but are not limited to the following:

1.1 Laboratory reports for the daily measurement of TOC concentrations in parts per million by volume TOC, expressed as methane, on a dry basis for each atmospheric vent.

1.2 Continuously recorded temperature, pressure, flow rate and volume in million standard cubic feet per day data for each atmospheric vent.

1.3 Daily TOC mass emissions data, in pounds per day, for each atmospheric vent.

1.4 Daily TOC mass emissions data converted to methane and organic compound emissions, in pounds per day, for each atmospheric vent.

506.2 For the owner and/or operator of any industrial hydrogen plant who has opted to comply with this Rule pursuant to Section 13-5-303, these records shall include, but are not limited to the following:

2.1 Laboratory reports for the daily measurement of methane concentrations in parts per million by volume, on a dry basis for each atmospheric vent.

2.2 Laboratory reports for the daily measurement of GHG concentrations in parts per million by volume, on a dry basis for each carbon dioxide scrubbing vent and/or deaerator vent.

2.3 Continuously recorded temperature, pressure, flow rate and volume in million standard cubic feet per day data for each atmospheric vent, carbon dioxide scrubbing vent and/or deaerator vent.

2.4 Daily methane mass emissions data, in pounds per day, for each atmospheric vent.

2.5 Daily GHG mass emissions data in total pounds per day for each carbon dioxide scrubbing vent and/or deaerator vent.

506.3 The owner and/or operator of any small-scale industrial hydrogen plant shall maintain records of the annual hydrogen production and basis for the production determination for a minimum of five years. The owner and/or operator shall make the records available to the APCO or a designee of the APCO upon request.

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13-5-601 Determination of Compliance and Monitoring of TOC Emissions: Emissions of TOC as specified in Sections 13-5-301, 13-5-501, and 13-5-504 shall be measured using any of the following methods:

601.1 SCAQMD Method 25.3 (modified as approved by APCO); or

601.2 Any other method approved by the APCO.

13-5-602 Determination of Compliance and Monitoring of Methane and Other Greenhouse Gas Emissions: Emissions of methane and other GHGs as specified in Sections 13-5-303, 13-5-502, and 13-5-503 shall be measured using any of the following methods:

602.1 EPA Method 18; or

602.2 Any other method approved by the APCO.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Underline/Strikethrough Version of Proposed New Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants Indicating Revisions from June 2021 Draft

NOTE: This ~~red strikeout~~ and blue underline version of Proposed Rule 13-5 is being provided as a curtesy to allow stakeholder the opportunity to make a direct comparison to the June 2021 version of draft Rule 13-5. Any references to specific sections or wording should be based on the clean copy of the proposed Rule above.

REGULATION 13
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REGULATION 13
CLIMATE POLLUTANTS
RULE 5
~~PETROLEUM REFINERY~~ INDUSTRIAL HYDROGEN PLANTS

(Adopted _____, 2020___)

13-5-100 GENERAL

13-5-101 Description: The purpose of this Rule is to limit total organic compounds (TOC) emissions~~—~~including methane~~—which includes both methane and organic compounds—~~from ~~petroleum refinery~~ industrial hydrogen plants.

13-5-102 Applicability: Upon adoption, this Rule applies to ~~petroleum refinery~~ industrial hydrogen plants including third parties~~ that produce hydrogen in hydrogen plants~~.

13-5-103 Exemption, Specific Operations: Specific operations of methane and/or organic compound emissions already subject to methane and/or organic compound emission requirements in Regulation 8: Organic Compounds, Rule 5: Storage of Organic Liquids; Regulation 8: Organic Compounds, Rule 10: Process Vessel Depressurization, Regulation 8: Organic Compounds, Rule 18: Equipment Leaks; and Regulation 8: Organic Compounds, Rule 28: Episodic Releases From Pressure Relief Devices at Petroleum Refineries and Chemical Plants shall be exempt from this Rule.

13-5-104 Limited Exemption, Deaerator Vents and Carbon Dioxide Scrubbing Vents: Deaerator vents and carbon dioxide scrubbing vents shall be exempt from the requirements in Section 13-5-300 of this Rule.

13-5-105 Limited Exemption, Small Scale Industrial Hydrogen Plants: The requirements of Sections 13-5-300, 500, 600 shall not apply to industrial hydrogen plants with maximum hydrogen gas production rate less than 20 tons of hydrogen per day, provided that the owner and/or operator meets the recordkeeping requirements of Section 13-5-506.3.

13-5-200 DEFINITIONS

13-5-201 Alternative Compliance Plan: A document meeting the requirements of Section 13-5-404 that identifies, among other things, sources, quantities, emissions, and emissions reduction measures that would be implemented to comply with the standards and deadlines set forth in Section 13-5-303.

13-5-20~~1~~2 Atmospheric Vent: An opening where a gas stream is continuously or periodically discharged during hydrogen plant operations. Atmospheric vents include openings where gas streams are discharged directly to the atmosphere or are discharged to the atmosphere~~ after being routed to a control device or a gas recovery device~~. For the purposes of this rule, an atmospheric vent may be physically located in any portion of an ~~Petroleum Refinery~~ industrial ~~H~~hydrogen ~~P~~plant.

13-5-20~~2~~3 Carbon Dioxide Scrubbing Vent: The atmospheric vent from a device or process unit that adsorbs carbon dioxide from a mixture of gases~~ stream~~.

13-5-20~~3~~4 Deaerator Vent: The atmospheric vent from a device that removes oxygen and other dissolved gases from liquids.

13-5-20~~4~~5 Effective Date: This Rule is effective upon adoption. However, the date when the requirements of Section 13-5-301 take effect shall be ~~five years following the adoption of this Rule unless the APCO's issuance of the Authority to Construct is such that complying with the required timeline~~ as set forth in Section 13-5-401~~ is not possible, in~~

~~which case compliance with the standard of Section 13-5-301 must be achieved within three years of issuance of the Authority to Construct~~. The date when the requirements of Section 13-5-303 take effect shall be as set forth in Section 13-5-405.

~~**13-5-205 Emergency:** A condition at a petroleum refinery beyond the reasonable control of the owner or operator requiring immediate corrective action to restore normal and safe operation that is caused by a sudden, infrequent, and not reasonably preventable equipment failure, natural disaster, act of war or terrorism or external power curtailment, excluding power curtailment due to an interruptible power service agreement from a utility.~~

~~**13-5-206 Gas Recovery System:** Equipment that captures gases from plant operations during any operations including startups, shutdowns, and malfunctions.~~

~~**13-5-207 Malfunction:** As defined in Regulation 1: General Provisions and Definitions, Section 1-208. [Any unforeseeable failure or malfunction of any air pollution control equipment or operating equipment which causes a violation of any emission standard or limitation prescribed by District, California or federal rules, regulations or laws, where such failure or malfunction:~~

~~206.1 Is not the result of intent, neglect, or disregard of any air pollution control law, rule or regulation;~~

~~206.2 Is not the result of improper maintenance;~~

~~206.3 Does not constitute a nuisance;~~

~~206.4 Is not an excessively recurrent breakdown of the same equipment.]~~

13-5-206 Global Warming Potential: A comparison of the integrated radiative forcing over a specified period (i.e., 100 years) from a unit mass pulse emission to compare the potential climate change associated with emissions of different greenhouse gases. GWPs listed include climate-carbon feedbacks. This Rule incorporates GWPs as listed in Regulation 3, Schedule T, Greenhouse Gas Fees, Global Warming Potential Relative to Carbon Dioxide.

13-5-207 Greenhouse Gas: "Greenhouse gas" (GHG) or "greenhouse gases" (GHGs) includes all of the following gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

13-5-208 Industrial Hydrogen Plant: For the purposes of this Rule, an industrial hydrogen plant is a comprehensive hydrogen operation including, but not limited to, all operations that produce hydrogen via steam-methane reformation, and the hydrogen distribution system, including all compression operations, and the hydrogen delivery system that delivers hydrogen streams to the process unit consumers.

13-5-209 Organic Compound: As defined in Regulation 1: General Provisions and Definitions, Section 1-233. ~~[Any compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate.]~~

13-5-2~~09~~10 Owner and/or Operator: A representative of the facility or corporation who possesses sufficient authority to take actions required for compliance with this Rule.

~~**13-5-210 Petroleum Refinery:** As defined in Regulation 12: Miscellaneous Standards of Performance; Rule 12 Petroleum Refining Emissions Tracking, Section 12-15-210. [An establishment that is located on one or more contiguous or adjacent properties that processes crude oil to produce more usable products such as gasoline, diesel fuel, aviation fuel, lubricating oils, asphalt, or petrochemical feedstocks. Petroleum Refinery processes include separation processes (e.g., atmospheric or vacuum distillation, and light ends recovery), petroleum conversion processes (e.g., cracking, reforming, alkylation, polymerization, isomerization, coking, and visbreaking), petroleum treating~~

~~processes (e.g., hydrodesulfurization, hydrotreating, chemical sweetening, acid gas removal, and Bay Area Air Quality Management District December 4, 2019 12-15-4 deasphalting), feedstock and product handling (e.g., storage, crude oil blending, non-crude oil feedstock blending, product blending, loading, and unloading), and auxiliary facilities (e.g., boilers, waste water treatment, hydrogen production, sulfur recovery plant, cooling towers, blowdown systems, compressor engines, and power plants).]~~

~~**13-5-211 Petroleum Refinery_Hydrogen Plant:** For the purposes of this rule, a petroleum refinery hydrogen plant is a comprehensive petroleum refinery hydrogen operation including, but not limited to, all operations that produce refinery hydrogen, the hydrogen distribution system, including all compression operations, the hydrogen delivery system that delivers hydrogen streams to the process unit consumers, and any disposed, recycled or spent hydrogen streams (or "tail gas") from the hydrogen consuming process units.~~

~~**13-5-212 Refinery Fuel Gas System:** A series of connected piping, valves and control systems from various process units that gather gaseous streams generated by refinery operations, and transports, treats and distributes the collected gaseous streams at suitable compositions and pressures for use as fuel in equipment such as boilers, furnaces, turbines or other combustion devices. Refinery fuel gas systems include gaseous streams that are collected separately, including flare gas recovery systems, or are otherwise routed to flares, oxidizers, or other abatement devices for destruction. Gaseous streams may contain a blend of methane, natural gas, light hydrocarbons, hydrogen and other miscellaneous organic, inorganic or inert gaseous species.~~

~~**13-5-213 Shutdown:** As defined in Regulation 12 Miscellaneous Standards of Performance; Rule 12 Flares at Petroleum Refineries, Section 12-12-210. [The intentional or unexpected cessation of a petroleum refining process unit or a unit operation within a petroleum refining process unit due to lack of feedstock or the need to conduct periodic maintenance, replacement of equipment, repair or other operational requirements. A process unit includes subsets and components of the unit operation. Subsets and components include but are not limited to reactors, heaters, vessels, columns, towers, pumps, compressors, exchangers, accumulators, valves, flanges, sample stations, pipelines or sections of pipelines.]~~

~~**13-5-214 Startup:** As defined in Regulation 12 Miscellaneous Standards of Performance; Rule 12 Flares at Petroleum Refineries, Section 12-12-211. [The initiation of or preparation for operation of a petroleum refining process unit. A process unit includes subsets and components of the unit operation. Subsets and components include but are not limited to reactors, heaters, vessels, columns, towers, pumps, compressors and exchangers.]~~

13-5-211 Steam-Methane Reformation Process: an industrial chemical process in which steam is used to produce hydrogen from a hydrocarbon source, such as natural gas in accordance with the following chemical reaction:

Steam-methane reforming reaction

$$CH_4 + H_2O \rightarrow CO + 3H_2$$

In a subsequently process called the "water-gas shift reaction," the carbon monoxide and steam are reacted using a catalyst to produce carbon dioxide and more hydrogen in accordance with the following chemical reaction:

Water-gas shift reaction:

$$CO + H_2O \rightarrow CO_2 + H_2$$

13-5-2124 Total Organic Compound (TOC): Any organic compound or mixture of organic compounds, including methane.

13-5-300 STANDARDS

13-5-301 Emission Limits for ~~Petroleum Refinery~~ Industrial Hydrogen Plants: By the Effective Date, an owner or operator of a petroleum refinery hydrogen plant shall not vent to the atmosphere any emissions containing more than 6.8 kilograms (15 pounds) per day and 300 parts per million by volume (~~ppmv)~~ (TOC, expressed as methane, on a dry basis determined as specified in Section 13-5-601). A source shall be considered in violation of this section if the TOC emissions measured in accordance with Sections 13-5-501 and 13-5-601 exceed the standards of this Rule.

13-5-302 Prohibition of Comingling and Dilution: ~~The emission standard set forth in Section 13-5-301 shall apply to each individual atmospheric vent.~~ The dilution of any atmospheric vent that is in service prior to the adoption of this Rule, or the comingling of two or more atmospheric vents, or both, to reduce the TOC concentration to comply with the emission standard set forth in Section 13-5-301 are prohibited.

13-5-303 Alternative Methane and Other Greenhouse Gas Emissions Standard Option: In lieu of compliance with Section 13-5-301, the owner and/or operator of an industrial hydrogen plant may opt to comply with this Rule by reducing the baseline methane emissions from the industrial hydrogen plant by at least 90 percent on a calendar year basis from atmospheric vents. Up to 20 percent of the methane reductions required may take the form of other GHG reductions from vents at the industrial hydrogen plant. These substituted emission reductions of other GHGs shall be adjusted based on global warming potential. To comply with this option, all of following conditions shall be met:

303.1 No later than six months after the adoption date of this Rule, the owner and/or operator shall notify the APCO in writing that the owner and/or operator of an industrial hydrogen plant have opted to comply with the Rule by means of this section;

303.2 No later than one year following the adoption date of this Rule, the owner and/or operator shall make an estimate of the baseline methane and other GHG emissions to be considered under this option for the industrial hydrogen plant in accordance with Section 13-5-403 and submit the estimate to the APCO for validation;

303.3 No later than six months following the validation by the APCO of the baseline methane and other GHG emissions calculated pursuant to Section 13-5-403, the owner and/or operator shall submit to the APCO for review and approval an Alternative Compliance Plan that demonstrates how methane and other GHG emission reductions would be achieved based on the validated baseline methane emissions as determined according to Section 13-5-403. The Alternative Compliance Plan shall be submitted in accordance with Section 13-5-404 and shall contain all information deemed necessary for the APCO to determine the efficacy of the plan. The APCO may request additional information to complete the review and approval of the Alternative Compliance Plan;

303.4 No later than two years following the adoption date of this Rule, the APCO shall approve or deny the Alternative Compliance Plan to meet this alternative standard. In the event that the plan is denied, the owner and/or operator of an industrial hydrogen plant may not utilize this optional standard and must comply with Sections 13-5-301 and 13-5-401.

13-5-400 ADMINISTRATIVE REQUIREMENTS

13-5-401 Control Device Requirements for ~~Petroleum Refinery~~ Industrial Hydrogen Plants: The owner or operator of an ~~petroleum refinery~~ industrial hydrogen plant shall comply with the following requirements provided the hydrogen plant does not already comply with the requirements of Section 13-5-301:

401.1 Within ~~two calendar~~ three years of adoption of this Rule, the owner and/or

operator, including the owner and/or operator that submits an Alternative Compliance Plan pursuant to Section 13-5-303 that is not approved, must submit a permit application to the APCO for an Authority to Construct and Permit to Operate of a TOC control device to comply with Section 13-5-301 requirements.

401.2 Upon receiving an Authority to Construct from the Air District, the owner or operator of a petroleum refinery hydrogen plant shall commence construction of the control device during the next scheduled turnaround; however, such construction shall begin no later than two years following the issuance of the Authority to Construct.

401.3 Within one ~~calendar~~ year of commencing construction of the control device, the owner and/or operator of an industrial hydrogen plant shall commence operation of the control device to comply with Section 13-5-301 requirements.

This section does not apply to the owner and/or operator who has submitted an Alternative Compliance Plan pursuant to Section 13-5-303 that is approved by the APCO.

13-5-402 Reporting Requirements for Total Organic Compounds Vented from ~~Petroleum Refinery~~ Industrial Hydrogen Plants: Should an existing ~~petroleum refinery~~ industrial hydrogen plant with a fully operational TOC control device vent TOC from atmospheric vents in excess of the standards required by Section 13-5-301, the owner or operator shall do the following:

402.1 Notify the APCO of the venting occurrence within ~~three business days~~ seventy-two hours of the beginning of the occurrence if the TOC emissions exceed limits in Section 13-5-301. ~~The owner or operator shall comply with the TOC emission limits within three business days upon discovery of the venting occurrence.~~

402.2 If notification to the APCO is required pursuant to Section 13-5-402.1, the owner and/or operator shall report the following information to the APCO: the cause of the occurrence; the date and time of the occurrence; data for the duration of the occurrence; the make, model and type of control device; the operating parameters of the control device including temperature, pressure, flow rate, and concentrations of each constituent in the gaseous stream; and the mass emissions for each constituent in the gaseous stream including TOC. The report is due within ten business days of the conclusion of the TOC gas venting occurrence.

13-5-403 Baseline Methane and Other Greenhouse Gas Emissions Calculation Procedures: The following methodology shall be used to determine baseline methane and GHG emissions for an industrial hydrogen plant for the purposes of determining compliance with Section 13-5-303:

403.1 Determine Baseline Period: The baseline period is the three-year period from January 1, 2016, through December 31, 2018.

403.2 Determine Baseline Methane and Other Greenhouse Gas Emissions: Baseline methane and other GHG emissions are the actual average annual emissions during the baseline period. The applicant must have sufficient verifiable records of the industrial hydrogen plant's operation to substantiate the emission rate during the entire baseline period.

13-5-404 Plan Submission for the Alternative Methane and Other Greenhouse Gas Emissions Standard Option: No later than six months following the validation by the APCO of the baseline methane and other GHG emissions calculated pursuant to Section 13-5-403, the owner and/or operator of an industrial hydrogen plant who has opted to comply with this Rule pursuant to Section 13-5-303 shall provide an Alternative Compliance Plan with the following information to the APCO:

404.1 Piping and instrumentation diagrams identifying all atmospheric vents, carbon dioxide scrubbing vents, and deaerator vents at the industrial hydrogen plant.

404.2 Estimates of the annual methane emissions for each atmospheric vent.

404.3 Methane concentration data and flowrate, temperature, flowrate, and volume

data that were used to estimate the methane emissions for each atmospheric vent.

404.3 Identification of the vents that would be included in the Alternative Compliance Plan and the method and degree to which each atmospheric vent, deaerator vent and/or carbon dioxide scrubbing vent would be controlled.

404.4 Estimates of other GHG reductions (expressed as GHG equivalent reductions) for each atmospheric vent, deaerator vent, and/or carbon dioxide scrubbing vent.

404.5 Any information deemed necessary to verify the estimate of GHG-equivalent reductions in Section 13-5-404.4.

13-5-405 Implementation of the Alternative Methane and Other Greenhouse Gas Emissions Standard Option: The owner and/or operator of an industrial hydrogen plant with the Alternative Compliance Plan approved pursuant to Section 13-5-303 shall implement the as follows:

405.1 Within one year of approval of the Alternative Compliance Plan pursuant to Section 13-5-303, the owner and/or operator must submit a permit application to the APCO for an Authority to Construct and Permit to Operate to comply with the plan approved pursuant to Section 13-5-303.

405.2 Upon receiving an Authority to Construct from the Air District, the owner and/or operator of an industrial hydrogen plant shall commence construction and/or installation of equipment to comply with the Alternative Compliance Plan approved pursuant to Section 13-5-303 during the next scheduled turnaround; however, such construction shall begin no later than two years following the issuance of the Authority to Construct.

405.3 Within one year of commencing construction and/or installation of equipment to comply with the Alternative Compliance Plan approved pursuant to Section 13-5-303, the owner and/or operator of an industrial hydrogen plant shall commence operation of the equipment to comply with Section 13-5-303 requirements.

13-5-500 MONITORING AND RECORDS

13-5-501 Monitoring Requirements, General: Effective within ~~12 calendar months~~ a year from the adoption of this Rule, the owner or operator of an ~~any petroleum refinery~~ industrial hydrogen plant shall:

501.1 Monitor on a daily basis, TOC emissions in total pounds per day and parts per million by volume ~~(ppmv)~~ TOC, expressed as methane, on a dry basis ~~from hydrogen plant~~ for each atmospheric vent~~s~~.

501.2 Continuously record temperature, pressure, flow rate and volume in million standard cubic feet per day for each atmospheric vent.

501.3 Convert TOC emissions data into mass emissions, in pounds per day, for both methane and organic compound emissions for each atmospheric vent.

501.4 By the next turnaround and no later than five years, the owner and/or operator of an ~~any petroleum refinery~~ industrial hydrogen plant shall install, operate, and maintain in good working order, a sampling point~~port~~ approved by the APCO for the purpose of testing emissions from ~~the~~ each atmospheric vent~~s~~. The owner and/or operator of an industrial hydrogen plant shall provide a piping and instrumentation diagram for each atmospheric vent and any information deemed necessary by the APCO to approve the sampling point.

~~All records shall be retained for a minimum of five years and shall be submitted to the APCO upon request.~~

13-5-502 Monitoring Requirements, Alternative Methane and Other Greenhouse Gas Emissions Standard Option: The owner and/or operator of an industrial hydrogen plant who has opted to comply with this Rule pursuant to Section 13-5-303 shall:

502.1 Monitor on a daily basis, methane emissions in total pounds per day and measurement of methane concentration in parts per million by volume, on a dry

basis for each atmospheric vent.

502.2 Monitor on a daily basis, GHG emissions in total pounds per day and measurement of GHG compound concentrations in parts per million by volume, on a dry basis for each carbon dioxide scrubbing vent and/or deaerator vent.

502.3 Continuously record temperature, pressure, flow rate and volume in million standard cubic feet per day for each atmospheric vent, carbon dioxide scrubbing vent, and/or deaerator vent at the industrial hydrogen plant.

502.4 Convert methane and other GHG emissions data into mass emissions, in pounds per day, for both methane and other GHG emissions for each atmospheric vent, carbon dioxide scrubbing vent and/or deaerator vent.

502.5 By the next turnaround and no later than five years, the owner and/or operator of an industrial hydrogen plant shall install, operate, and maintain in good working order, a sampling point approved by the APCO for the purpose of testing emissions from each atmospheric vent, carbon dioxide scrubbing vent and/or deaerator vent. The owner and/or operator of an industrial hydrogen plant shall provide a piping and instrumentation diagram for each atmospheric vent, carbon dioxide scrubbing vent, and/or deaerator vent and any information deemed necessary by the APCO to approve the sampling point.

13-5-503 Reporting Requirements, Alternative Methane and Other Greenhouse Gas Emissions Standard Option: The owner and/or operator of any industrial hydrogen plant who has opted to comply with this Rule pursuant to Section 13-5-303 shall submit a summary of the annual methane and other GHG emissions and emissions reductions calculated from the baseline emissions determined in accordance with Section 13-5-403 that indicates compliance with Section 13-5-303 at the end of the 30th day following the end of each year after the effective date of this Rule.

13-5-5024 Monitoring Requirements, Deaerator Vents and Carbon Dioxide Scrubbing Vents: Effective within ~~12 calendar months~~ one year of ~~from~~ the adoption of this rule, the owner and/or operator of an ~~any petroleum refinery~~ industrial hydrogen plant that operates deaerators or carbon dioxide scrubbing equipment shall:

5024.1 Install, operate and maintain in good working order, a gas flowrate meter equipped with a readout and recorder~~, in~~ for each deaerator vent ~~atmospheric vents,~~ and/or carbon dioxide scrubbing vent~~s~~.

5024.2 Monitor TOC emissions in parts per million by volume ~~(ppmv)~~ TOC, expressed as methane, on a dry basis from each deaerator vent~~s~~ and/or carbon dioxide scrubbing vent~~s~~ on a quarterly basis. After eight quarterly samples have been obtained from each deaerator vent and/or carbon dioxide scrubbing vent, the owner and/or operator of an industrial hydrogen plant may submit a request to the APCO for a decreased monitoring frequency.

5024.3 TOC emissions data from each deaerator vent~~s~~ and/or carbon dioxide scrubbing vent~~s~~ shall be recorded in mass emissions in pounds per day for both methane and organic compounds.

5024.4 By the next turnaround and no later than five years, the owner and/or operator of an ~~any petroleum refinery~~ industrial hydrogen plant ~~that operates deaerators or carbon dioxide scrubbing equipment~~ shall install, operate, and maintain in good working order, a sampling point ~~port~~ approved by the APCO for the purpose of testing emissions from ~~the atmospheric vents~~ each deaerator vent and/or carbon dioxide vent. The owner and/or operator of an industrial hydrogen plant shall provide a piping and instrumentation diagram for each deaerator vent and/or carbon dioxide scrubbing vent and any information deemed necessary by the APCO to approve the sampling point.

13-5-5035 Monitoring Requirements, Pressure Swing Adsorption Vents: Effective within ~~12 calendar months~~ a year from the adoption of this Rule, the owner and/or operator of an ~~any petroleum refinery~~ industrial hydrogen plant shall demonstrate hydrogen gas percent purity via the use of a hydrogen gas analyzer or an alternative method approved by the ~~Air District~~ APCO. Purity verification shall be recorded quarterly and will be

available upon request by the APCO. All records shall be retained for a minimum of five years and shall be submitted to the APCO upon request.

13-5-5046 **Recordkeeping Requirements:** The owner and/or operator of an ~~any petroleum refinery~~ industrial hydrogen plant shall keep the following records ~~of all petroleum refinery hydrogen plant atmospheric venting during normal operating conditions and venting due to startups, shutdowns, malfunctions and emergencies. Records shall include temperature; TOC mass emissions of both methane and organic compounds, in pounds per day; parts per million emissions by volume (ppmv) TOC, as methane, on a dry basis; venting duration; gas composition; volume vented in million standard cubic feet per day (mmscfd); and for any startup, shutdown, malfunction or emergency, the reason for such startup, shutdown, malfunction or emergency. All records shall be retained for a minimum of five years and shall be submitted~~ in a form suitable for inspection for a period of at least five years and made available to the APCO upon request.

506.1 For the owner and/or operator of an industrial hydrogen plant subject to the requirements of Section 13-5-301, these records shall include, but are not limited to the following:

1.1 Laboratory reports for the daily measurement of TOC concentrations in parts per million by volume TOC, expressed as methane, on a dry basis for each atmospheric vent.

1.2 Continuously recorded temperature, pressure, flow rate and volume in million standard cubic feet per day data for each atmospheric vent.

1.3 Daily TOC mass emissions data, in pounds per day, for each atmospheric vent.

1.4 Daily TOC mass emissions data converted to methane and organic compound emissions, in pounds per day, for each atmospheric vent.

506.2 For the owner and/or operator of any industrial hydrogen plant who has opted to comply with this Rule pursuant to Section 13-5-303, these records shall include, but are not limited to the following:

2.1 Laboratory reports for the daily measurement of methane concentrations in parts per million by volume, on a dry basis for each atmospheric vent.

2.2 Laboratory reports for the daily measurement of GHG concentrations in parts per million by volume, on a dry basis for each carbon dioxide scrubbing vent and/or deaerator vent.

2.3 Continuously recorded temperature, pressure, flow rate and volume in million standard cubic feet per day data for each atmospheric vent, carbon dioxide scrubbing vent and/or deaerator vent.

2.4 Daily methane mass emissions data, in pounds per day, for each atmospheric vent.

2.5 Daily GHG mass emissions data in total pounds per day for each carbon dioxide scrubbing vent and/or deaerator vent.

506.3 The owner and/or operator of any small-scale industrial hydrogen plant shall maintain records of the annual hydrogen production and basis for the production determination for a minimum of five years. The owner and/or operator shall make the records available to the APCO or a designee of the APCO upon request.

13-5-600 MANUAL OF PROCEDURES

13-5-601 **Determination of Compliance and Monitoring of TOC Emissions:** Emissions of TOC as specified in Sections 13-5-301, 13-5-501, and 13-5-5042 shall be measured using any of the following methods:

~~**601.1** EPA Method 25 or 25A;~~

601.21 SCAQMD Method 25.3 (modified as approved by APCO); or

601.32 Any other method approved by the APCO.

13-5-602 Determination of Compliance and Monitoring of Methane and Other Greenhouse Gas Emissions: Emissions of methane and other GHGs as specified in Sections 13-5-303, 13-5-502, and 13-5-503 shall be measured using any of the following methods:

602.1 EPA Method 18; or

602.2 Any other method approved by the APCO.